Letters

American Astronautical Society

I recently read in the news section of *Science* [**131**, 1658 (1960)] the item on the new International Academy of Astronautics, established by a Guggenheim grant. In the interest of accurate reporting and courtesy, I should like to point out a glaring error in this note. In describing the International Astronautical Federation, the item states, "The United States member, the American Rocket Society . . . ," implying a single member from the U.S. This is incorrect. There are, in fact, three American societies in the federation. In addition to the American Rocket Society, the American Astronautical Society has been a member since 1954, and in 1959 the Aerospace Medical Association was elected to membership.

The American Astronautical Society is the only American society devoted solely to the advancement of astronautics and was the first in this country to offer comprehensive technical programs in all fields of astronautics. It has also been very active in IAF activities through committee work in the past years.

GEORGE R. ARTHUR
American Astronautical Society, New York, New York

Federal and State Support of Science

The issue of *Science* for 22 April contained several unusually interesting and significant articles. Particularly noteworthy was the excerpt from *Notes on the Reviewing of Learned Books* [**131**, 1182 (1960)] by the late George Sarton. The procedures outlined by Sarton are such as to deserve consideration by all of us.

Paradoxically, the very next issue of *Science* [**131**, 1307 (1960)] contained a book review, by Harold L. Enarson, of *Science and State Government* by F. N. Cleaveland, which conforms to very few of Sarton's recommendations. Even more unfortunate, the review contains implied statements of fact that are undocumented, which are simply the opinions of the reviewer.

Particularly regrettable are the following passages in the review:

1) "The notion of shared responsibility between the federal government and the states in scientific activity is extravagant nonsense. The big money comes from Washington; the pattern and pace of government research effort is determined in Washington, whether in research on agriculture or on mental illness."

2) "Scientific activity in the states reflects the traditional obsessions, notably the heavy emphasis on agricultural research and on applied research generally. Perhaps the states may be 'chasing the wrong rabbits'. . . . The talents of researchers at the state university are rarely mobilized to bear on the . . . problems of a state."

I hold no brief for Cleaveland's book. It undoubtedly has shortcomings that deserve critical comment. But the above quotations from the Enarson review are the kind of sweeping generalizations, highly charged with personal opinion unsupported by evidence, that one does not expect to find in a journal read by scientists. It is because the implications and conclusions of the reviewer are so patently contrary to fact that I feel impelled to call the matter to your attention.

On page 41 of the book, the federal contributions to state expenditures for scientific activities are listed. Among the six states surveyed, the federal support ranged from 10.3 to 33.6 percent. The average was 26.9 percent.

On pages 55–56, the text shows that federal contributions to agricultural research represented only from 7 to 22 percent of the total invested in five of the states. For one state (New Mexico) it was 31 percent. Thus, in fiscal 1954, the period covered by the survey reported in the book, the big money did not come from Washington in respect to total state expenditures for scientific activities, or in respect to state expenditures for agricultural research.

It is true the survey shows that 26 to 52 percent of the total state expenditures for scientific activities were in support of agricultural research. On the other hand, it is explained on pages 24–25, "the relative importance of research in agriculture is exaggerated by the limited amount the state expended on operating programs in agriculture—less than on the operations of the other three fields of governmental activity (that use research extensively)."

The operating programs in agriculture tend to be largely the responsibility of the federal government. The U.S. Department of Agriculture conducts research, but the funds available to the department for research in agriculture and forestry are a small fraction of the billions being used annually in the department's operating programs, such as crop acreage control and price supports.

Nor is this the only, or even the most important, factor explaining the apparently more generous support of research in agricultural experiment stations than in most of the other branches or col-

leges of the state institutions to which the experiment stations are attached. The difference is due in large part to the accounting procedures in most land-grant institutions. Except in agriculture, the practice is to assume that a professor uses 10 to 50 percent of his time in research as a necessary part of his responsibility as a teacher, particularly where graduate instruction is provided. A modest estimate is that at least a quarter of the expenditures charged to instruction in the nonagricultural segments of most land-grant institutions are essentially the same as those charged to research in the experiment station.

Those who have had experience on the senior staff of representative state agricultural experiment stations know that the administrators of these stations will not take dictation from officials of the U.S. Department of Agriculture. Neither will they permit such officials to impose their will on members of the station staff.

It is true that the Congress now provides grants to the states for support of agricultural research, about 29 million dollars annually. But every dollar of this money is spent on research selected and conducted by the experiment stations in essentially the same manner as research financed by state funds provided the stations. No federal official can choose the studies on which the federal grant funds are spent, or pressure the research workers in the procedures used in doing the research.

A very considerable portion of the research conducted by the U.S. Department of Agriculture with its own funds is carried out in cooperation with the state agricultural experiment stations. This voluntary cooperation specifically recognizes, in written memoranda covering each cooperative study, the rights and independence of the cooperating parties. The fruitfulness of these joint activities of federal and state agencies engaged in agricultural research are constantly admired by agricultural research workers from abroad, who often express the wish that they could find ways of accomplishing the same teamwork in their home countries.

I would not want to imply that there never is any controversy between state and federal administrators of research. Neither group is made up of yes men. But to make the bold statement, as does the reviewer of the Cleaveland book, that "the pattern and pace of government research . . . [in the states] is determined in Washington, whether in research on agriculture or on mental illness", is to make a statement that simply is not true.

Finally, the reviewer would have been well advised to have been more discriminating when he wrote "scientific activity in the states reflects the traditional obsessions, notably the heavy emphasis on agricultural research and on applied research generally. Perhaps the states may be 'chasing the wrong rabbits.' "

I happen to be associated with the agricultural experiment station in one of the six states covered in the survey reported in the Cleaveland book. Our station has on its staff at the present time 11 members of the National Academy of Sciences. Two years ago the Nobel Prize for science was awarded to a member of our staff for work he did in this station. The professor who trained this Nobel laureate, and who was also awarded the Nobel Prize in science, was likewise trained in this station. The belittling references to research workers in agricultural experiment stations hardly deserve consideration by persons familiar with the contributions to basic science and technology which have come out of the state agricultural experiment stations. My hope is that those who do not have this information will not be misled by the Enarson review, which makes such sweeping derogatory statements.

NOBLE CLARK
Agricultural Experiment Station, University of Wisconsin, Madison

I welcome the opportunity to respond to Noble Clark, who finds my review of *Science and State Government* inadequate and unfair—inadequate by the test of Sarton, unfair by the test of his one example, the agricultural experiment station.

I reread Sarton with trepidation. Had Sarton forbidden the expression of opinion, decreed that all general comments be elaborated, documented, footnoted? If so, I—and for that matter most other reviewers—am guilty as charged. But of course Sarton said no such thing; indeed he urges that reviewers not be fearful of expressing judgment, realizing always that a judgment is "at best, imperfect and precarious."

But, enough of Sarton. His excellent advice is not in issue. Let's move to the points of difference between Clark and myself. He quarrels with my convictions that (i) "shared responsibility" between the federal government and the states in scientific activity is more myth than fact; (ii) "The big money comes from Washington; the pattern and pace of government research effort is determined in Washington . . ."; and (iii) "Scientific activity in the states reflects the traditional obsessions, notably the heavy emphasis on agricultural research and on applied research generally"—with the result that "the talents of researchers at the state university are

rarely mobilized to bear on the . . . problems of a state."

He is entitled to challenge these judgments. But his arguments should be addressed to these points, not to imaginary slights. There are no "belittling" references to research workers in agricultural experiment stations in my review. I did *not* say that the experiment station research workers might be "chasing the wrong rabbits," but rather that the *states* might be doing just that in the over-all pattern of their research effort. And I am at a loss to see the relevance of the prideful reference to Academy and Nobel Prize winners at Wisconsin. To dispose briefly of another straw man, I did not—as Clark implies—assert that federal officials "pressure the research workers," nor did I suggest that administrators of experiment stations "take dictation from officials of the U.S. Department of Agriculture." These are your own windmills, Don Quixote, not mine.

First, "shared responsibility" between the federal government and the states for research. Let's look at the facts. Does such a phrase really describe the various ways in which research programs are financed by the Department of Defense, the Atomic Energy Commission, the National Science Foundation, or even the Department of Agriculture? Is there sharing with the state when the Defense Department buys research from the Rand Corporation, or the University of Wisconsin? Is there "sharing" in the proposal that a $100-million linear accelerator be financed at Stanford University, in the National Science Foundation grants for support of the National Radio Astronomy Laboratory, in the AEC grants to universities for building nuclear reactors? Is there "sharing" with the states in the medical research programs of the National Institutes of Health? In 1960, the state-government contribution to medical and health-related research is estimated at $20 million; this is 3 percent of the total bill, of which the federal government pays over half. Moreover, the federal share is increasing steadily, with the latest estimates that by 1970 $2 billion of the $3 billion for medical research will in all likelihood be provided by the federal government (see the testimony of the Committee of Consultants on Medical Research; Labor–Health, Education, and Welfare Appropriations for 1961; Hearings before the Subcommittee of the Committee on Appropriations, U.S. Senate, 86th Congress, Second Session on H.R. 11390).

In none of these large grant programs, which constitute the bulk of federal research effort, are the grants shared—or even cleared, processed, or channeled through the states. Shared responsibility indeed!

As for agricultural research, is not the phrase *shared responsibility* more likely to obscure than to illuminate this complex relationship? See Charles Hardin's book *The Politics of Agriculture* for an analysis of some of the forces shaping the nation's agricultural research programs. Surely if we are to critically appraise the many complex and different ways that federal research grants are made, we cannot be content with rhetorical phrases such as *shared responsibility* and the conventional wisdom which indulges such cliché-thinking.

Second, the federal dominance in research. Who calls the piper, Washington or 50 state capitols? In fiscal 1959–60, the federal government will spend more than $750 million to finance university research. Seventy percent of all research conducted by universities is federally financed.

The "pace and pattern" *is* set by Washington.

Example: The major research efforts in health have been launched because the Congress chooses to invest larger and larger sums in medical research: $3 million in 1940, $380 million (estimated) in 1960.

Example: The pattern in medicine has been that of individual project grants. The National Institutes of Health are now pressing for "institutional grants," to restore to the universities some freedom in determining which investigators and which research interests they wish to support.

Example: In physics, 90 percent of university research is supported by federal funds; the pattern is set in Washington, on the advice of scientists, not in the state capitols.

Example: Federal research is heavily concentrated. Five universities have over $20 million of federal research funds, and one is reputed to have over $90 million.

The issue is not whether federal officials lay hands on university researchers and control their individual research effort. Rather, the point is that the pattern of university research is profoundly shaped by the availability of federal funds. And these federal funds may encourage applied research to the detriment of basic research, may tempt universities to rely unduly on the interests of federal agencies in shaping their research programs. In many fields, as Charles Kidd points out [*American Universities and Federal Research* (Harvard Univ. Press, 1959)], "one of the most significant effects of federal research funds has been to remove from universities the authority to make some decisions they formerly made. Which faculty members are to receive aid for their research and what amounts are they to receive? Such questions are now decided generally by scientific groups meeting in Washington, not by persons or groups within the institution."

We need not deplore this, for there may be no other way to mobilize the nation's research talent in pursuit of nation goals. But surely there is no sense in playing the ostrich and denying the powerful impact of federal funds on the life of our universities.

Third, that scientific activity in the states "reflects the traditional obsessions, notably the heavy emphasis on agricultural research and on applied research generally." Let's put this to a practical test. Who has the best chance of getting money from the state legislator, the experiment station director seeking research funds to study the diseases of cranberries, or the sociologist looking for the causes and cures of juvenile delinquency? Agricultural research will win out most of the time for the simple reason that rural groups exercise disproportionate power in the state legislatures. I do not think it "belittles" the fine efforts of the experiment station workers when I reiterate my point: that "research on urban development, housing, and smog may be more urgent than the search for new varieties of rust-resistant wheat."

If this be heresy, I suspect it's the sort of heresy George Sarton might have enjoyed.

HAROLD L. ENARSON
Western Interstate Commission for Higher Education, Boulder, Colorado

Information on Drugs

"Science in the News" in your 29 April issue [*Science* **131**, 1299 (1960)], in commenting on the Kefauver drug hearings, reports the lack of a "convenient index of information" that would allow physicians "to sort out the misleading from the meaningful messages among the barrage of promotion to which they are subject. . . ."

A beginning in providing just such information has, in fact, been made in the form of a newsletter called "The Medical Letter on Drugs and Therapeutics." This fortnightly publication is issued by a nonprofit organization, it carries no advertising, and it is supported solely by the fees of its 14,000 subscribers, most of them physicians. With the aid of a distinguished advisory board of medical clinicians and investigators and a broad panel of special consultants, the editors of "The Medical Letter" provide subscribers with concise, authoritative, and unbiased appraisals of both new and old drugs.

PAUL H. LAVIETES
Drug and Therapeutic Information, Inc., New York, New York